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09/995,041	11/26/2001	Konstantin I. Boudnik	SUNMP032	3339

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EXAMINER

CHOW, CHIH CHING

ART UNIT PAPER NUMBER

2122

DATE MAILED: 02/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

*Am*

## Office Action Summary

Application No.

09/995,041

Applicant(s)

BOUDNIK ET AL.

Examiner

Chih-Ching Chow

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 April 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

### **DETAILED ACTION**

1. This action is responsive to the application filed on November 26, 2001.
2. The priority date considered for this application is November 26, 2001.
3. Claims 1-20 have been examined.

#### ***Specification***

4. The disclosure is objected to because of the following informalities:
  - Paragraph 0001, Ser. No. is missing (should be 09/989,928)
  - Paragraph 0023, DPF should be spelled out for the first time usage
  - Paragraph 0058, last line, "system 114ais", should be "system 14a is"
  - Paragraph 0070, Ser No. is missing (should be 09/989,928)Appropriate corrections are required.

#### ***Claim Objections***

5. Claim 13 is objected to because of the following informalities: Claim 13 recites "A method as recited in claim 12, wherein the application is a test harness that executes a plurality of individual tests"; the Examiner believes the 'application' should be 'application program' instead. Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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7. Claims 6 and 14 recite the limitation "the point of execution" in line 1. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1-8 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S.

Patent No. 6,105,148 by Pi-Yu Chung et al. (hereinafter "Chung").

**CLAIM**

1. A system for restoring execution of an application program after interruption in a distributed processing framework, comprising:

a post mortem object storing point of execution information for an application program, wherein the point of execution information is periodically updated to reflect a current point of execution within the application program at a time of the update; and

an agent process executing on a processing resource, wherein the agent process is capable of utilizing the post mortem object to reinitialize the application program to begin execution from a position described by the point

**Chung**

Chung teaches a prior art which would restore execution of an application program after interruption in a distributed network. See Chung column 1, last sentence to top of column 2, "Generally, **checkpoint** and restoration techniques **periodically** save the process state during normal execution, and thereafter restore the saved state following a failure." Here the checkpoint data is the '**post mortem object**', checkpoint data is periodically updated while the application program is in operation. FIG. 1, item 70 and 75, a 'Network Interface' for a **distributed system**, also item 20, *Processing Node*, is an **agent process** executing on a

of execution information.

processing resource. In Chung's disclosure, the application program can be 'reinitialized' (restarted) from the last checkpoint, see Chung column 6, lines 42-44, "a **restart** subsystem 90 will attempt to recover the faulty application process by **initiating a restart** of the faulty application process, at its **latest checkpoint**".

2. A system as recited in claim 1, wherein the agent process sends an information request to the application program requesting execution information.

For the feature of claim 1 see claim 1 rejection. For the rest of the claim 2 feature see Chung column 9, lines 31-33, "due to a failure, or the user application process has **requested** that the **checkpoint file (execution information)** should be stored for subsequent restoration."

3. A system as recited in claim 2, wherein the application program returns execution information to the agent process in response to receiving the information request.

For the feature of claim 2 see claim 2 rejection, further in Chung, column 9, lines 34-49, Chung continues the description of the process in response to receiving the information request as described in claim 2, "If it is determined during step 540 that a valid checkpoint file does exist for the associated user application process, then the pre-execution checkpoint subroutine 152 will preferably return and execution of the restoration subroutine 158, discussed below in conjunction with FIGS. 8A and 8B, will preferably commence during step 550, in order to restore the data associated with the existing checkpoint file and

commence execution of the user application process at the point of the restored checkpoint. ...If, however, it is determined during step 540 that a valid checkpoint file does not exist for the associated user application process, then the pre-execution checkpoint subroutine 152 will preferably return and execution of the user application process is preferably initiated during step 560".

4. A system as recited in claim 3, wherein the execution information includes the current point of execution within the application program.

For the feature of claim 3 see claim 3 rejection, in Chung's disclosure, the most current checkpoint state will be restored; see Chung column 10, lines 3-7, "it can be subsequently accessed by the file system call interception subroutine 156, which implements checkpoints of the persistent state, in order to associate the persistent state checkpoints with the appropriate (current) volatile checkpoint".

5. A system as recited in claim 4, wherein the application program is a test harness that executes a plurality of individual tests.

For the feature of claim 4 see claim 4 rejection, Chung's disclosure is meant for a real implementation for an application program, however, if his closure can run at a real system, it can be implemented, by those skilled in the art, as a test harness.

6. A system as recited in claim 5, wherein the point of execution refers to an individual test of the test harness that was most recently executed.

For the feature of claim 5 see claim 5 rejection. Chung's disclosure can be run as a test harness, therefore it can handle any test cases in the test suite,

and it's obvious that the disclosure can capture the 'point of execution' for an individual test that was most recently executed.

7. A system as recited in claim 6, wherein the agent process updates the post mortem object with an indication of the individual test referred to by the point of execution.

For the feature of claim 6 see claim 6 rejection. Chung's disclosure has a way to figure out at a certain point a crash has occurred, see column 6, lines 31-39, "In a passive monitoring arrangement, each application process includes a function from the library 150, which, when invoked by a user application process, such as the process 40, will send a heartbeat message at specified intervals to the watchdog 80, indicating that the associated process 40 is still active. If the watchdog 80 does not receive another signal (*indication*) from the application process 40 before the end of the specified interval, the watchdog 80 will presume that the application process is hung or has crashed."

8. A system as recited in claim 7, wherein the agent process can reinitialize the test harness to begin execution from a particular individual test specified in the post mortem object.

For the feature of claim 7 see claim 7 rejection. Chung's disclosure allows the application to be restarted at a particular checkpoint, see column 6, lines 42-44, "a restart subsystem 90 will attempt to recover the faulty application process by initiating a restart (*begin execution*) of the faulty application process, at its latest checkpoint (*post mortem*)".

9. A method for restoring execution of an application program after interruption in a distributed processing framework, comprising:

providing an agent process in communication with an application program;

updating a post mortem object using the agent process, wherein the agent process updates the post mortem object based on a current point of execution within the application program; and

reinitializing the application program after interruption of the application program utilizing the post mortem object.

Chung's disclosure does restoring execution after interruption in a distributed processing framework. See Chung's Abstract, "By checkpointing and restoring a user application process, recover (*reinitializing*) of an application process from the checkpoint position is possible." For the rest of claim 9 feature see claim 1 rejection.

10. A method as recited in claim 9, further comprising the operation of sending an information request from the agent process to the application program.

For the feature of claim 9 see claim 9 rejection, for the rest of the claim 10 feature see claim 2 rejection.

11. A method as recited in claim 10, further comprising the operation of sending execution information from the application program to the agent process in response to receiving the information request.

For the feature of claim 10 see claim 10 rejection, for the rest of the claim 11 feature see claim 3 rejection.

12. A method as recited in claim 11, wherein the execution information includes a current point of execution within the application program.

For the feature of claim 11 see claim 11 rejection, for the rest of the claim 12 feature see claim 4 rejection.

13. A method as recited in claim 12,

For the feature of claim 12 see claim 12



wherein the application is a test harness that executes a plurality of individual tests.

rejection, for the rest of the claim 13 feature see claim 5 rejection.

14. A method as recited in claim 13, wherein the point of execution refers to an individual test of the test harness that was most recently executed.

For the feature of claim 13 see claim 13 rejection, for the rest of the claim 14 feature see claim 6 rejection.

15. A method as recited in claim 14, further comprising the operation of updating the post mortem object with an indication of the individual test referred to by the point of execution.

For the feature of claim 14 see claim 14 rejection, for the rest of the claim 14 feature see claim 7 rejection.

16. A method as recited in claim 15, further comprising the operation reinitializing the test harness to begin execution from a particular individual test specified in the post mortem object.

For the feature of claim 15 see claim 15 rejection, for the rest of the claim 16 feature see claim 8 rejection.

17. A computer program embodied on a computer readable medium for restoring execution of an application processing framework, the computer program comprising:

Chung's disclosure definitely contains code segments of receiving execution information, updating checkpoint data, and reinitializing the application program, an example is shown in Chung's FIG. 10.

a code segment that receives execution information from an application program, wherein the execution information includes a current point of execution within the application program;

For the rest of claim 17 feature see claim 1 and 9 rejections.

a code segment that updates a post mortem object based on the execution information; and

a code segment that reinitializes the application program utilizing the post mortem object after interruption of the application program.

18. A computer program as recited in claim 17, wherein the application is a test harness that executes a plurality of individual tests, and wherein the point of execution refers to an individual test of the test harness that was most recently executed.

For the feature of claim 17 see claim 17 rejection, for the rest of the claim 18 feature see claim 5 and 6 rejections.

19. A computer program as recited in claim 18, wherein the post mortem object is updated with an indication of the individual test referred to by the point of execution.

For the feature of claim 18 see claim 18 rejection, for the rest of the claim 19 feature see claim 7 rejection.

20. A post mortem object as recited in claim 19, wherein the test harness is reinitialized to begin execution from a particular individual test specified in the post mortem object.

For the feature of claim 19 see claim 19 rejection, for the rest of the claim 20 feature see claim 8 rejection.

### ***Conclusion***

10. The following summarizes the status of the claims:

35 USC § 102 rejection : Claim 1-20

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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Koo, "Checkpointing and Rollback-Recovery for Distributed Systems", by Richard Koo and Sam Toueg, Proceedings of 1986 ACM Fall joint computer conference, discloses a method for creating checkpoint data and recover the system to a consistent state.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chih-Ching Chow whose telephone number is 571-272-3693. The examiner can normally be reached on 7:00am - 3:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Dam can be reached on 571-272-3695. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

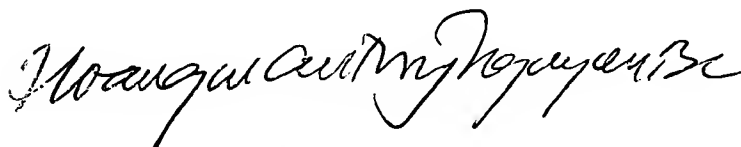
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Chih-Ching Chow

Examiner

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CC



ANTONY NGUYEN-BA  
PRIMARY EXAMINER